## THE GASTEROMYCETES OF AUSTRALASIA.

### viii. The Genus Mycenastrum.

(Plate xxii, figs. 5-8.)

This genus contains a single species, which has been collected in practically every country in the world, though it is most abundant in sandy regions.

The peridium ranges in size from 2 cm. to 20 cm. or more, and may be globose, obovate or pyriform. It consists of the usual two tissues, exoperidium and endoperidium.

The exoperidium is thin, floccose and usually smooth externally, but forms occur in which the flocci are aggregated into definite scales; at maturity it usually falls away completely, exposing the endoperidium. This latter tissue is unlike that of the other genera of this sub-family in that it is thick, 2-5 mm., and indurated. In young plants it may appear almost cartilaginous, but in mature plants it is hard and coriaceous, or even corky.

The peridium may dehisce in a stellate manner, or by the falling away in irregular flakes from the apical portion.

The gleba consists of spores and capillitium, and is decidedly pulverulent at maturity. The capillitium threads are peculiar and characteristic. Each consists of a short main stem which may be simple or short-branched, and is covered with short, acuminately pointed spines. These threads differ considerably, even in the same plant, in the degree of spininess, shape and size. Mixed with the capillitium threads are usually present numerous long and unbranched septate hyphae of a type similar to those forming the peridium.

#### Mycenastrum Desvaux.

*Ann. Sci. Nat.*, 2, 1842, xvii, p. 143.—*Pachyderma* Schulz., *Verh. Zoo. Bot. Ges. Wien.*, 1875, xxv, p. 79.

Peridium globose, obovate or pyriform, of two layers; a thin, floccose exoperidium; and a thick, indurated, persistent endoperidium; dehiscing in a stellate manner, or by the irregular rupture of the apical portion; sterile base absent.

Gleba olivaceous, becoming umber, pulverulent; capillitium threads very abundant, of numerous short hyphae, continuous, short-branched or simple, branches beset with stout, spinous processes. Spores globose or elliptical, coloured, coarsely echinulate.

*Habitat*:—Solitary, in small groups or caespitose on the ground; epigaean.

*Distribution*:—Europe; North America; Asia; India; Africa; Australia; New Zealand.

The genus is characterized by the nature of the capillitium, the hard and coriaceous endoperidium and the method of dehiscence.

#### Mycenastrum corium (Guersent) Desvaux. Plate xxii, figs. 5-8.

*Ann. Sci. Nat.*, 1842, xvii, p. 147.—*Lycoperdon corium* Guers., in DC. *Fl. Fr.*, suppl. 2, 1815, p. 598. *Bovista suberosa* Fr., *Syst. Myc.*, iii, 1829, p. 26. *Scleroderma*

*corium* Grev., in Duby *Bot. Gall.*, ii, 1830, p. 892. *Mycenastrum phaeotrichum* Berk. in Hook. *Lond. Jour. Bot.*, ii, 1843, p. 418. *M. chilense* Mont., *Ann. Sci. Nat.*, ser. 2, xx, 1843, p. 375. *Endoneuron suberosum* Czern., *Bull. Soc. Imp. Mosc.*, xviii, 1845, p. 152. *Mycenastrum leptodermeum* Dur., *Fl. Alg.*, 1849, p. 386. *M. radicatum* Dur., *l.c.*, p. 387. *M. Beccarii* Pass., *Nuov. Giorn.*, vii, 1875, p. 183. *Pachyderma Strossmayeri* Schulz., *Verh. Zoo. Bot. Ges. Wien*, xxv, 1875, p. 79. *Mycenastrum clausum* Schulz., *Ibid.*, xxvii, 1877, p. 114. *Bovista spinulosa* Peck, *Bot. Gaz.*, iii, 1879, p. 170. *Mycenastrum spinulosum* Peck, *Thirty-Third Rept. for* 1879, 1883, p. 15. *M. olivaceum* Cke. et Mass., *Grev.*, xvi, 1887, p. 33. *Scleroderma phaeotrichum* (Berk.), de Toni, in Sacc. *Syll. Fung.* vii, 1888, p. 139. *S. chilense* (Mont.) de Toni, *l.c.* *S. spinulosum* (Peck) de Toni, *l.c.* *S. radicatum* (Dur.) de Toni, *l.c.* *S. leptodermeum* (D. et M.) de Toni, *l.c.* *S. Beccarii* (Pass.) de Toni, *l.c.* *S. olivaceum* (Cke. et Mass.) de Toni, *l.c.*

Peridium globose, subglobose, obovate or pyriform, up to 20 cm. diam.; exoperidium tomentose, fugacious, greyish; endoperidium thick, 2-5 mm., smooth, polished, at first greyish. becoming bay brown, dehiscing in a stellate manner, or by the irregular falling away of the apical portion.

Gleba olivaceous, becoming umber, pulverulent; capillitium threads of the usual type. Spores globose or shortly elliptical, 11-13 $\mu$ diam., apedicellate; epispore chestnut brown, densely echinulate, reticulate, wall 2 $\mu$ thick.

*Habitat*:—Solitary, in groups or caespitose on the ground.

*Distribution*:—Same as that of the genus.

Queensland:—*Barron Falls, Kuranda, Sept., 1917.

South Australia:—*Glen Osmond, Dec., 1920; *Adelaide, Oct., 1922; Feb., 1921; *Encounter Bay, Jan., 1924; *Pt. Elliot, Aug., 1918, D. I. Cleland.

Western Australia:—*Kalgoorlie, June, 1916.

New South Wales:—*Dungog, Nov., 1916; *Moore Park, Sydney, Dec., 1917; *Mudgee, Dec., 1917; *Cowra Experimental Farm, Dec., 1917; *Coolamon, May, 1918; *Narrabri, June, 1919.

New Zealand:—Castlepoint, Wairarapa, Jan., 1923, Miss Edwin; Spring Creek, Blenheim, Jan., 1925, W. D. Reid; Levels, Canterbury, Jan., 1927, G.H.C.

The species varies greatly in the size of the peridium, degree of spininess of the capillitium, roughness of the spores, and colour of the gleba. Usually if plants are collected and dried when young the gleba appears olivaceous; if dried when mature it may be umber or even purple.

Caespitose plants are frequent, at least in Australia and New Zealand. Plants break away from the point of attachment at maturity and are then often carried for considerable distances by wind, being rolled along the ground, and in this manner the spores are widely dispersed.

EXPLANATION OF PLATE XXII.

Fig. 5. *Mycenastrum corium.* × ⅔. Showing the thick endoperidium and the stellate method of dehiscence. (Photo. H. Drake.)

Fig. 6. *M. corium.* × ½. Showing the flaking exoperidium. (Photo. by writer.)

Fig. 7. Capillitium. × 125. Showing the spinose nature of the threads; air bubbles in the lumen of the threads show dark in this photo. (Photomicrograph by writer.)

Fig. 8. Spores. × 1200. Drawn from a lactic acid mount with the aid of a camera lucida; New Zealand form. The spines are somewhat exaggerated.

* Collections in the herbarium of Dr. J. B. Cleland, Adelaide University.